

RNAscope® Probes for Infectious Disease RNA Biomarkers Get molecular detection with morphological context in a single assay.

Above: HCV infected cells: HCV and 18s mRNA expression using the RNAscope® Multiplex Fluorescent Assay.

Featured Publications using RNAscope[®] Technology

Mucoepidermoid Carcinoma Does Not Harbor Transcriptionally Active High Risk Human Papillomavirus Even in the Absence of the MAML2 Translocation

Bishop JA, Yonescu R, Batista D, Yemelyanova A, Ha PK, Westra WH, Head & neck pathology (2014): 1-5. PMID: 24706055 | doi: 10.1007/ s12105-014-0541-9.

Detection of viral pathogens in high grade gliomas from unmapped nextgeneration sequencing data. Cimino PJ, Zhao G, Wang D, Sehn JK, Lewis JS, Duncavage EJ. Exp Mol Pathol. 2014 Apr 1;96(3):310-315 PMID: 24704430 | doi: 10.1016/j. yexmp.2014.03.010.

Tracking the Luminal Exposure and Lymphatic Drainage Pathways of Intravaginal and Intrarectal Inocula Used in Nonhuman Primate Models of HIV Transmission. Smedley J, Turkbey B, Bernardo ML, Del Prete GQ, Estes JD, Griffiths GL, Kobayashi H, Choyke PL, Lifson JD, Keele BF. PLoS One. 2014 Mar 25;9(3):e92830. PMID: 24667371 | doi: 10.1371/ journal.pone.0092830.

RNAscope[®] with

Molecular Detection visualizes what genes are expressed.

 $\label{eq:morpholocical context localizes} \frac{Morpholocical \ \underline{C}ontext \ localizes}{\ where \ those \ genes \ are \ expressed}.$

Infectious Disease

Direct detection and visualization of microbial (viral, bacterial and parasitic) RNA in human cells by RNA *in situ* hybridization (ISH) is a powerful tool to establish the etiology and pathogenesis of human diseases caused by pathogens.

RNA ISH has served as the definitive tool in certain detection cases. For instance, RNA ISH has been considered the gold standard for Epstein-Barr virus (EBV) detection in tissue samples. Almost all the cells with latent EBV infections express high levels of EBER-1 and -2 transcripts, which can be easily identified by RNA ISH. This makes RNA ISH the most reliable method for determining if a lesion is related to EBV infection.

Thus far, the use of traditional RNA ISH in the clinical setting has been limited to the detection of highly abundant transcripts such as EBER-1/2. With single molecule sensitivity of ACD's RNAscope® technology, this sensitivity barrier of RNA ISH is removed, extending the utility of RNA ISH for the study and diagnosis of many more infectious diseases. The RNAscope-based HPV assay has proven to be a sensitive, specific and practical tool for demonstrating transcriptionally active HPV in oropharyngeal cancers (Ukpo *et al.*, 2011).

Highly sensitive and specific RNAscope probes can be designed and manufactured for virtually any pathogenic sequences within 2 weeks. RNAscope holds great promise for accelerating



Figure 1. Human head and neck cancer: HPV *E6/E7* mRNA expression in FFPE tissue with the RNAscope® VS Detection Kit



Figure 2: Human head and neck cancer: HPV *E6/E7* expression in FFPE tissue with RNAscope[®] 2.0 HD Detection Kit

research and diagnostics in a variety of infectious diseases.

Visualize your infectious disease RNA biomarkers today acdbio.com/infectious

RNAscope Infectious Disease RNA Probe List

CAT #	Probe Name	Probe Description	CAT #	Probe Name	Probe Description
406921	BovineAstrovirus	Bovine astroviurs	316261-C2	Probe - HSV1-LAT- FL-C2	Herpes simplex virus-1 LAT gene
406021-C2	HSV-GC-C2	Herpes simplex virus, UL44 gene coded virion glycoprotein C	409771	Probe - MusPV-E6-E7	Mus musculus papillomavirus type 1, E6 and E7 gene
407131	Probe - CBV1-virus	Human coxsackievirus B1	415081	Probe - V-BRSV-F- protein	Bovine Respiratory Syncytial Virus, mRNA for F protein
406031-C2	Probe - HSV-ICP4-C2	Human herpesvirus 1, RS1 gene coded immediate early protein	412521	Probe - V-CTV-T36	Citrus tristeza virus, strain T36
405151	Probe - ViralRNA-VP16	Human herpesvirus 1, UL48 coded transactivating tegument protein VP16	412531-C2	Probe - V-CTV-T68-C2	Citrus tristeza virus, strain T68
404441	Probe - HsParechoVirus- polyprotein	Human parechovirus 2	409281	Probe - V-CVB1	Human coxsackievirus B1
313241	Probe - Influenza_mp	Influenza A virus	409291	Probe - V-CVB3	Human coxsackievirus B3
316571	Probe - OHV-2	Ovine herpesvirus 2	409301	Probe - V-CVB4	Human coxsackievirus B4
316581	Probe - OHV-2-sense	Ovine herpesvirus 2, sense probe	415631	Probe - V-Langat	Langat virus
404501	Probe - VEEvirus-NSP3	Venezuelan equine encephalitis virus, NPS gene	408941	Probe - V-LCMV-NP	Lymphocytic choriomeningitis virus, nucleoprotein
408211-C2	Probe - VEEvirus-NSP3- sense-C2	Venezuelan equine encephalitis virus, NPS gene, sense probe	415641	Probe - V-Powassan	Powassan virus
314261	Probe - EF633448	Ovine herpesvirus 2 , glycoprotein B gene	414851	Probe - V-Rac-VP1	Raccoon polyomavirus, VP1 gene
410711	Probe - Hendra-virus- Ngene	Hendra viru, N gene	416171	Probe - V-Soromba	Soromba virus
412001	Probe - Hepacivirus- NPHV	Hepacivirus	318961	Probe - HCV-H77	Hepatitis C virus
314131	Probe - HHV3-ORF61	Human herpesvirus 3 ORF61	416101	Probe - V-HIV1-CladeA	HIV1 CladeA
314681	Probe - HHV4-LMP1	Human herpesvirus 4 LMP1 gene	416111	Probe - V-HIV1-CladeB	HIV1 CladeB
311921	Probe - Hs-HIV	Human immunodeficiency virus	416121	Probe - V-HIV1-CladeD	HIV1 CladeD
315651	Probe - HSV-1-LAT	Herpes simplex virus-1 LAT gene			

REFERENCES

1. Ukpo OC, Flanagan JJ, Ma XJ, Ma XJ, Luo Y, Thorstad WL, Lewis JS Jr (2011).4. High-Risk Human Papillomavirus E6/E7 mRNA Detection by a Novel *In Situ* Hybridization Assay Strongly Correlates With p16 Expression and Patient Outcomes in Oropharyngeal Squamous Cell Carcinoma. American J of Surgical Pathology, 35(9):1343–1350. PMID: 21836494 | doi: 10.1097/PAS.0b013e318220e59d.

ACD offers an ever-growing selection of RNA biomarker probes. We design probes for virtually ANY gene from ANY species in ANY tissue. Don't see your gene of interest? We can design your custom probes within 2 weeks.

Visualize your infectious disease RNA biomarkers today acdbio.com/infectious

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